NATIONAL AGRICULTURAL CHEMICALS ASSOCIATION

NEWS

AND PESTICIDE REVIEW

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NATIONAL AGRICULTURAL CHEMICALS ASSOCIATION

NEWS

AND PESTICIDE REVIEW

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ENTOMOLOGY CENTENNIAL WAS PUBLICITY SUCCESS

The results of last year's "Hundred Years of Professional Entomology" public relations program have now been made public. They present an impressive picture, to which some members of the NAC contributed substantially. The record shows that:

1. Hundreds of newspapers and magazines, radio and TV stations used centennial information supplied them through the fact book, press associations, news and feature syndicates, and State and Federal agencies. The fact book, "Insect Facts," was distributed to 1,500 key persons in public communications. State and Federal agencies supplied 360 press releases; 180 radio releases, and 60 TV packages, scripts, or visuals.

2. Seven nation-wide network radio programs were presented to an audience of more than 20 million. More than 3,000 other radio programs originated over State networks or local stations.

3. Two network TV programs and 163 local TV programs were presented.

4. More than 100 feature articles were printed in newspapers and magazines.

5. The slogan, "Fight Your Insect Enemies," was used as a postal cancellation in 120 post offices to cancel 650 million pieces of mail; was printed on covers of eight U. S. Department of Agriculture publications distributed to 365,000 persons.

6. The motion picture, "500,000 to 1," was viewed by millions of persons.

7. The publication, "Fighting Our Insect Enemies," was distributed to 48,000 persons, frequently quoted from by press and magazines, and reprinted in its entirety as a newspaper advertisement.

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The NAC News and Pesticide Review is the official publication of the National Agricultural Chemicals Association, 1145 19th St., N. W., Washington 6, D. C. Telephone: STerling: 3-2833. L. S. Hitchner, Executive Secretary.

Published in the interests of furthering the proper use of chemicals in agricultural production. Issued six times yearly during each even-numbered month. Controlled, free circulation to scientists, agricultural leaders, industrialists, segments of the press, and federal and state agricultural workers.

Research Endangered by Legislative Excesses

History shows that the path of scientific research and development has often been far from smooth, and that on occasion there has been violent public reaction to new discoveries. Such examples as Lord Joseph Lister's problems with antiseptic surgery, the fight against vaccination, the difficulties of Louis Pasteur, come immediately to mind. And in the lifetime of many people can be remembered the rioting in the streets when automobiles were first introduced, and the laws preventing use of bathtubs because people slipped and fell in them.

The day has passed when every automobilist had to hire a man to precede him with a red flag to warn unwary pedestrians of his coming, but the instinct to lash out at new products is still very much with us—even in the most progressive country in the world. The agricultural chemical industry has already seen, to its surprise and sorrow, the degree of frightened reaction that its products have sometimes occasioned. Though the introduction of pesticides met very little initial resistance from the public, certainly less than many of the innovations of medicine and mechanization, there has been a growing tendency to snipe at them, ranging from serious desires to control *irresponsible* use of pesticides, to the wild charges of meddling crack-pots.

The NAC has given its wholehearted support to serious, well-considered efforts to construct sound legislation, and practical, workable controls *where they are needed.* The NAC's hard work in helping to frame the Miller Amendment is eloquent enough proof of its desire to support such responsible steps. But the NAC feels fully justified in objecting strenuously to many other efforts, often reflecting inaccurate and emotional charges, which are headed in the general direction of putting a red flag in front of the development and use of pesticides, regardless of their proved value to the nation's agriculture.

These efforts usually go through three phases. First comes a rash of adverse, unsubstantiated statements about pesticides—often by wild-eyed people utterly incompetent to speak on the subject. Other, more serious charges involve the misuse of pesticides, either as a result of inadequate instruction or of carelessness. In the second phase, unjustified and excessive liability claims tend to crop out, capitalizing on growing public fears of this "unknown"—which is doubly unknown because the actions of chemicals still seem very mysterious to the public at large, still smack of sorcery. Then comes the third phase, where legislation is proposed against various phases of production, marketing, distribution, and use of pesticides. It can be said that the disease is latent in all parts of the country today, and erupts with uncomfortable virulence in many states from time to time.

While the long-run answer to this lies in education—as rapid as possible—and the passage of time which brings acceptance and familiarity, it is important that the agricultural chemicals industry speak up to warn of the serious effects that harassing and punitive legislation can have—not only on the pesticide industry, but on agriculture itself.

The real danger is that research in agricultural chemicals—which is the life blood of the farmer's ability to fight insects, weeds, and plant diseases—may suffer as a result of what is certainly a temporary phenomenum. When it takes $1,500,000 to develop a new pesticide even before it is put into production, no manufacturer can be blamed if he hesitates to make such a huge investment unless he feels that there will be a good market for his product. Every time he hears that the sale or use of his products may be restricted, or heavily taxed in still another state, he is apt to get more cautious about footing the bill for new products. Though he knows that the farmer *needs* these new products, the manufacturer cannot afford to produce them without prospects of reasonably free distribution.

Then what happens to the farmer, who has grown used to having an ample supply of pesticides available, and at a very reasonable price? A new strain of insect develops, immune to previous insecticides, and there is no adequate chemical to deal with it. The farmer's losses go up accordingly. Stocks of existing chemicals become inadequate in some localities, and—if there is a sudden increase in bugs—the farmer finds himself in the position of a householder whose house is on fire, only to discover that the fire engine is not available.

Speaking before the NAC meeting in St. Louis (see Page 7), Undersecretary of Agricultural True Morse deplored the still huge losses by America's farmers to farm pests, and said, "We are looking to the agricultural chemicals industry to help reduce these losses. It is a $13 billion order."

Pesticide manufacturers want nothing more than to help reduce these unnecessary losses. They are willing to invest heavily in research and plant in order to do so. But they cannot go very far or very fast if a man with a red flag is placed in front of them.

CENTENNIAL SUCCESS—*(Continued from Page 2)*

8. At least 40 feature articles were carried in industrial trade journals and house organs. Many devoted advertising space to the program.

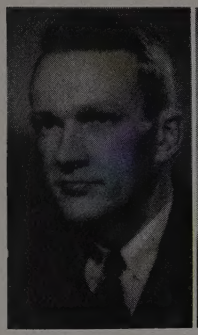
9. Roughly, 425 speeches—32,000 listeners; 167 exhibits—200,000 viewers; 32,000 educational demonstrations and tours—2,600 persons; 18 open houses—5,300 attendance, and 20 commemoration banquets—1,800 attendance.

Since no funds were available for press clipping services, radio or TV surveys, or public opinion sampling, it was impossible to determine exactly what further impact this campaign had, but it is clear that no comparable dramatization of the battle against insects has ever been made.

Here & There

The Pennsylvania Salt Manufacturing Company has announced some major changes in its personnel, both in its main office in Philadelphia, and in its subsidiary, Pennsylvania Salt Manufacturing Company of Washington.

William P. Drake has been appointed Executive Vice President of the parent firm and elected to the Board of directors in anticipation of the retirement of President George B. Beitzel next fall. Drake, though only 42 years old, has been with Pennsalt for 21 years, and was president of the Industrial Chemi-



William P. Drake

Errol H. Karr

cals Division of Pennsalt prior to his new appointment.

On the West Coast, **Errol H. Karr** has been named Vice President of the Pennsylvania Salt Manufacturing Company of Washington. Formerly manager of Technical development, Karr has been with Pennsalt for 20 years. After the war he participated in a U.S. government mission to report on German chemical technology.

In other recent changes, **J. Drake Watson** has been named assistant to the Agricultural Chemicals Manager at Tacoma, and **Charles G. Whinfrey, Jr.** has been named sales manager in charge of a new Agricultural Sales Northern Division, with offices in Aurora, Illinois.

A new corporation called **Diamond Black Leaf Co.** has been formed by Virginian Carolina Chemical Corp., Richmond, Va., and Diamond Alkali Co., Cleveland, Ohio. The new firm will take over both manufacturing and marketing of "Black Leaf" agricultural chemicals and pest control products. It will be managed by Diamond Alkali, which retains the major interest in the new firm, with Virginia-Carolina holding a minority interest. Under the terms of the agreement, Diamond Alkali will acquire Virginia-Carolina's interest in the new firm over the next five years.

Loren P. Scoville, general manager of Diamond's chlorinated products division, has been named president of the new company. **Dr. Bruce D. Gleissner** will be vice-president, while **John W. Kennady** will be general manager.

* * *

Earle Stevens has been named vice-president and general manager of Durham Chemical Co., Los Angeles, Cal.

* * *

Edwin H. Ginn will be the manager of the newly created Agricultural Advertising Division of Hercules Powder Co.

* * *

Frank Seeland is the new manager of S. B. Penick & Co.'s insecticide division.

* * *

H. D. McGowan has been named assistant director of market development of Stauffer Chemical Co.

* * *

Dr. Richard C. Back, formerly with Ethyl Corporation, has joined Carbide and Carbon Chemicals Company as entomologist for the agricultural chemicals development group.

Chemical Society Gives Important Role to Agricultural Chemicals

Growing recognition of the importance of agricultural chemicals in the chemical industry was apparent at the recent meeting of the American Chemical Society at Cincinnati, Ohio on March 29 through April 7.

Top chemists from the entire country heard NAC's Technical Adviser Joseph A. Noone preside over a day-long panel discussing developments in the field of pesticides. The chairman of the Pesticides Subdivision which presented the panel is Dr. L. W. Hazelton, of Hazelton Laboratories, Falls Church, Virginia.

In the field of pesticides alone, 18 highly technical papers were presented before the assembled chemists, bearing largely on analytical methods and determination of residues of pesticides on various crops, and the chemical, physical, and biological properties of new pesticides.

Insecticides Play Important Role in Technical Aid Program Abroad

Insecticides are playing an important role in American foreign policy, under the scope of Technical Cooperation program. A recent pamphlet by the Foreign Operations Administration gave some revealing side-lights of how American insecticides are helping agricultural production in friendly nations.

Crop spraying in Peru on three selected farms resulted in a 400 per cent increase in production. A control of leaf-cutting ants, which previously destroyed 95 per cent of the gardens in Peru, has now been developed, and similar control of wooly aphids is expected to double the apple crop. In Honduras, a grasshopper menace was checked by insecticides, and spraying of vegetables in Haiti increased yields by 40 per cent.

Similar experiences were found in the Near East. Pistachio trees in Iran, which had been unproductive for 18 years, bore a crop of nuts valued at $3,000,000 after being sprayed. Use of insecticides on beans in Libya increased yields by 50 per cent.

In the Far East, potato yields in Indonesia were boosted 80 per cent by use of insecticides, and the rice crop of Formosa showed a 30 per cent increase in yield after being treated with insecticides.

Agricultural Aviation Comes of Age; Applicators Move Toward Professionalism

New Tailored Equipment, Scientific Pilot Training Symbolize Present Trend

Agricultural aviation, after a very squally infancy, is now growing up fast. Both in its scope and quality, aerial application is a very different operation than it was only five years ago, when a scattering of light-hearted "fly boys" gave the profession a spotty reputation in some parts of the country.

Today, however, the "work-horse" of the aviation industry has already come a long way. Aerial applicators now fly as many hours as the combined revenue operations of American Airlines and Eastern Airlines (the largest and third largest commercial airlines in the country). And they treated close to 40,000,000 acres of land in 1953, or the equivalent of the harvested crop land of California, Oregon, Washington, Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming.

In addition, the industry which was improvised in a rather haphazard fashion after World War II is increasingly characterized by high standards of training and performance, courses at agricultural colleges, better equipment, and a solid, professional attitude toward its job. Most aerial applicators today are responsible, competent businessmen who are performing a real service to the farmer.

Spraying Increasingly Popular

The biggest job for the farmers is done in spraying and dusting. At present, aerial applicators spray more acres annually (17,188,000) than they dust (13,476,000 acres). Most dusting today is done in the South, where cotton crops sometimes require dusting every four or five days. Applicators find spraying increasingly popular, partly because it can be done safely at higher wind velocities. Over 235,000,000 pounds of chemicals are dusted on crops by plane in a year's time, and over 47,000,000 gallons are sprayed.

Insecticides are applied by air more than other chemicals, but herbicides, fungicides, and plant hormones are also applied in quantity. Aerial application of herbicides is considered particularly effective in controlling weeds, has the added advantage of eliminating root and wheel damage to crops, and can be performed when the ground is too wet to use ground applicators.

After spraying and dusting, agricultural aviation finds its greatest use in fertilizing (over 255,000,000 pounds and 1,900,000 gallons a year), in seeding (152,000,000 pounds a year) and in applying defoliants (16,000,000 pounds and 31,000,000 gallons a year). There are also a host of minor activities which keep the planes and pilots busy: checking crops and distributing poison bait in Western states, chasing birds from rice-fields, spraying towns, and even agitating cherry trees.

7000 Planes Used

To do these jobs, a vast and varied fleet of some 7000 planes is now in operation. For spraying purposes, the light Piper is still most used, while dusters prefer slightly heavier planes, such as Stearmans, Travelairs, or Navy N3Ns. However, some very big planes, such as B-17s and C-46s, are sometimes used on larger jobs, where wide area coverage is essential. Helicopters are highly thought of for application work, because their natural down-draft and slow speed make spraying and dusting very accurate. However, the high cost of helicopters ($30,000 to $40,000) is still considered prohibitive by many applicators.

A proud "baby" of the agriculture aviation industry is the new "Air Tractor", which is eyed as lovingly by aerial applicators as a new Cadillac is by their ground-bound cousins. Though it looks like a World War I relic at first glance, fresh from tangling with the Richtofen squadron, this plane is the "latest word" in design and construction for spraying and dusting. Its stubby, biplane wings give it maximum maneuverability, and ability to take off with a heavy load on a short runway. The gull-wing feature gives the pilot maximum visibility, and the plane can carry a payload of 2500 pounds. Now in production by Lamson

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THE "AIR TRACTOR"

Designed specifically for use in agricultural aviation, this new plane is noted for its maneuverability and pay-load. It will cost about $15,000, fully equipped.

AGRICULTURAL AVIATION—

(Continued from Page 5)

Aircraft, the "Air Tractor" will cost about $15,000. Five other planes specially designed for aerial application are also being developed, thereby providing pilots with tailored equipment for the first time, to take the place of the improvised planes which have served to date.

Air Application Quick, Flexible

These are the overall facts. Aerial applicators have an established niche in farming today, and for good, solid economic reason. With the supply of farm labor decreasing and food consumption increasing, aerial application makes more and more sense. Even small planes can treat as many as 1000 acres in a working day, while larger planes can spray or dust up to 3,000 acres a day. In the same way that herbicides reduce the labor needs of the farmer (it has been estimated that one chemical worker is worth 800 men with a hoe), it should be noted that 1 pilot and 4 unskilled helpers can spray herbicides over 100 acres in 30 minutes, while 5 unskilled ground workers would require 60 hours to do the same job.

Another unique advantage of aerial applicators is their mobility and capacity to handle sudden, dangerous outbreaks of pests, such as the Army worm menace in 1954, where—in the most heavily infested areas—aerial application was more than double that of any other method used. In Minnesota, in 1953, during a tent caterpillar "invasion", 32 aircraft were mobilized to spray 60,000 acres in two weeks time (using $75,000 of DDT in the process). In western Massachusetts, during an infestation of Gypsy moths, 800,000 acres were sprayed in a two month period by a fleet of two C-46s, 6 medium and light aircraft, and two helicopters. Some 5,000,000 acres of the nation's forest have been treated from the air during the last five years and, this year again, large fleets are getting ready to attack the spruce budworm, which is making serious ravages in the wooded northwest. Congress is expected to appropriate $2,570,000 for control of this and other forest pests this year.

Probably the most dramatic use of aircraft in agriculture takes place in rice growing. In California, for example, nearly all the rice crop is now seeded by plane, then fertilized and weeded by plane as well. Harvesting is the only important process done on the ground. Here is a development, perfectly in line with American mechanical and organizational genius, which would make a Chinese peasant's eyes pop.

Local Farmer Chief Customer

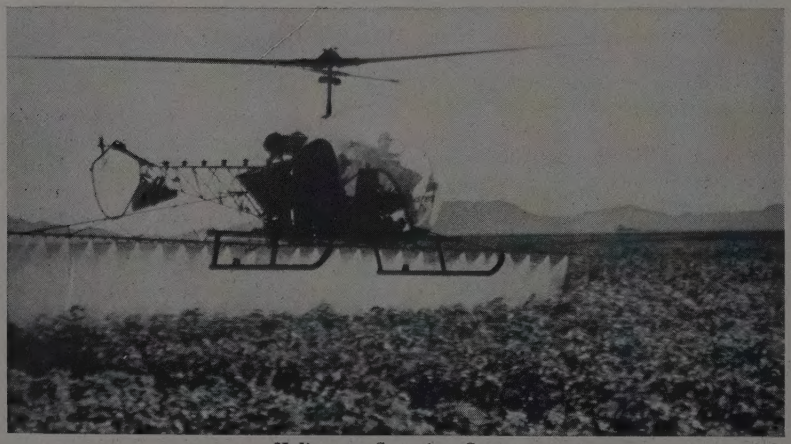
Though these may be the headline-catchers, the bread and butter of the aerial applicators is the local farmer who wants to have insect-free and weed-free crops, and who doesn't want to spend too much money to achieve this blessed state. In order to gain the farmer's confidence, the aerial applicators have "weeded" themselves during recent years of much of the irresponsible elements who set up shop after the war with a $800 surplus plane, a hopper of chemicals, and an eye for a quick dollar. Today, through painful elimination on one hand, and the constant striving toward higher standards by both state applicator associations and the National Aviation Trades Association, the industry has reached a promising half-way station toward complete professionalism.

The pattern of the trend is clear. The more responsible state associations now urge a state registration of aerial applicators, a minimum experience requirement for pilots, a performance bond to be posted, and a short course for all members at the state agricultural college. One of the pioneer applicators, Jack Reynolds of North Carolina, underscores the need of the pilots to know a great deal more than just how to fly a plane. He says, "They need a general knowledge of agriculture, and the pilot must also know entomology, and the feeding habits of bugs and insects; he must know insecticides and what to apply and when to apply; and he must have good mechanical ability since airport repair shops are not as plentiful as garages."

Scientific Training Next Goal

Probably the high point in pilot training, which is the crux of the applicators' drive toward professionalism, is getting under way soon in Texas. Texas A & M University, the Texas Aerial Applicators Association, and Civil Aeronautics Association's Gale Hanson have joined to provide for the scientific training of pilots desiring to enter the aerial applicator field. The school will start in the fall of 1955, and is considered as a pattern which may well be duplicated at other Land Grant Colleges. It is significant of the growing sense of responsibility of the applicators that their trade association not only actively supported the establishment of the school, but is providing funds for it as well.

The need for good aerial applicators is clear. It is highly specialized work—a valuable and sometimes indispensible aid to the farmer. Ideally, the applicator should not only be a first-class pilot, but should also be a fair agronomist, chemist, and entomologist, with a good leavening of business experience thrown in. It is not an easy order, but the aerial applicator industry is now making rapid strides toward that goal. Just as new planes have finally been tailored to the specific needs of the industry, a new mould of highly-skilled and specially trained pilots is also emerging to put aerial application on a professional basis.



Helicopter Spraying Cotton
Helicopters are popular with aerial applicators, but expensive.

NAC's Meeting in Saint Louis Held Before Attentive Audience

Undersecretary of Agriculture Morse Praises Use of Chemicals on Farms; Wider Application Seen by Speakers

A highly attentive audience of more than 400 leaders of agriculture, science, government, and the chemical industry explored the theme of "Better Farming with Agricultural Chemicals" at NAC's Spring Meeting in St. Louis on March 7-9.

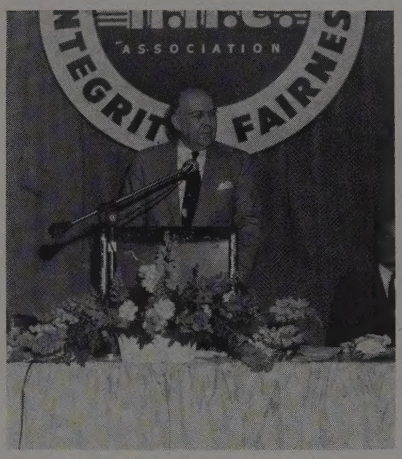
Guest speaker at the luncheon banquet, True D. Morse, Under Secretary of Agriculture, praised the use of chemical products on farms, saying they "have helped stabilize and expand farm production and have increased the income of farmers." He added that "both farmers and consumers are greatly indebted to the chemists and the chemical industry for the contributions that have been made to the food and fiber industries." Describing farming as a costly contest between man and his natural enemies that runs into billions of dollars each year, Morse said: "We look to the chemical industry for the methods and products that will help reduce these huge losses. It is a $13 billion order."

His evaluation of the growing importance of agricultural chemicals was supported by guest speaker Fred V. Heinkel, president of the Missouri Farmers Association, who predicted, "I have no doubt that the use of agricultural chemicals will become even more widespread in the years ahead."

Farmers Sharecropping with Insects

Considering the farmers' problem in more specific terms, Dr. George C. Decker, entomologist of the Illinois Agricultural Experiment Station, said that every farmer in the world is sharecropping with insects, but that the average farmer has no idea how big a share the insects are getting. During a panel discussion of "Better Farming with Soil Insecticides", he added that the least understood and the most insidious of these pests attack the roots of plants.

To fight these destructive pests, the use of soil insecticides on Iowa farms has risen from an application to 25,000 acres in 1952 to 600,000 acres in 1954, according to Dr. J. H. Lilly, professor of entomology at Iowa State College, who foresaw widespread use of this new type of insecticide in the future. "Soil insecticides have been tested and proven for control of rootworms," he said, "and some early tests indicate they may give control for two years."



Guest Speaker Morse
Undersecretary of Agriculture addresses NAC's members at luncheon banquet.

Soil insecticides were also cited by Dr. Oscar N. Allen, professor of agricultural entomology at the University of Wisconsin, for their "high degree of efficiency in controlling soil insect populations". Mixing soil insecticides with fertilizer has proved one of the most economical and popular ways of doing the job, according to C. C. Compton, of Shell Chemical Corporation, who said on the same panel that initial studies with insecticides (in conventional formulations) indicated that wettable powders, dusts, emulsible concentrates and, in a few instances, oil solutions, gave good control of insects if the products were properly applied.

Stored Grain Subject to Insect Ravages

Describing the growing problem of insect damage to stored grain, D. A. Wilbur, professor of Entomology at Kansas State College, stated: "Few farmers weigh grain before it is binned at the farm, so they do not know how much the insects destroy." Yet he pointed to laboratory tests, which showed that a single granary weevil reduces the weight of a wheat kernel by approximately 55 per cent. He further reported that "farmers are using insecticidal control in their grain storage program more than ever before. This includes residual sprays to treat the premises, protectants to apply to the grain as it is binned, and fumigants to kill established infestations." In Kansas, such measures more than paid for themselves in the amount of grain saved, he said.

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Leaders of Government, Science, and Industry at St. Louis
A cordial exchange of views by Arthur W. Mohr (former NAC President), Dr. W. G. Reed (U. S. Department of Agriculture), Professor George C. Decker (University of Illinois), and W. W. Allen (NAC President).

ST. LOUIS MEETING—

(Continued from Page 7)

Wider Use of Herbicides Predicted

A panel of experts discussing "Better Farming with Herbicides" agreed that herbicides would be used more widely in the future. Dr. M. W. Parker, speaking for the U.S. Department of Agriculture, described herbicides as a key to increased production of foodstuff with available land and farm labor. He also revealed that the Department now had 38 professional employees in its Weed Investigation Section—an indication of the growing importance of this field. Dr. Robert D. Sweet, of the Department of Vegetable Crops at Cornell University, predicted the increased use of herbicides in horticultural crops, pointing to the high return per acre that justified the use of good weed control practices. Dr. A. E. Carlson, of Dupont's Grasselli Chemicals Department, said that further mechanization of cotton will be possible with the increased use of herbicides, while Dr. Lloyd Sherwood of Monsanto Chemical Company, described several pre-emergence herbicide which offers good control of weeds in cotton, alfalfa, clovers and other crops. Hillard Smith of The Dow Chemical Company predicted an increased use for 2,4-D and 2,4,5-T in the next few years, and also observed that these and other herbicides have not yet reached their peak use.

Industry Leaders Cautious

The most cautious note was sounded by the chemical manufacturers themselves, who stressed the constant need for education of the farmer and the need for more orderly marketing processes. W. W. Allen, NAC President, said that the rapid appearance of new farm chemicals makes the job of educating dealers and farmers more complex. Nonetheless, he insisted this is a necessity in order to insure proper use as well as to promote sales. "No manufacturer, on grounds that he is small or entered the field late, can excuse himself for a share of this responsibility," he stated. Allen also pointed to the immense cost of developing a new insecticide: approximately $1,500,000, even before it is put into production.

John L. Gillis, Vice President of Monsanto Chemical Company, urged a return of the demonstration teams which formerly carried the story of agricultural chemicals from county to county. "These teams enabled the farmer to evaluate new products under soil and weather and crop conditions closely approximating his own," he said. He described the need for manufacturers to do a good selling job, and added: "It was encouraging to see the NAC organize the herbicide educational program. I urge continued support for it. But we can't look to the association nor the government nor the other fellow to do our creative selling job for us." Gillis further urged NAC members to intensify their efforts with the American farmer who must "produce a better diet for more mouths than history has ever known."

Miller Bill Studied

On the last day of NAC's meeting, the significance of the new Federal legislation known as the Miller Amendment was studied closely. Intended to insure protection of consumers from improper use of pesticides, this law was referred to by W. G. Reed, Head of the Pesticide Regulation Section of the U.S.D.A. in the following terms during a panel discussion: "We feel we have a good law —one that will result in safe uses that will win and hold public confidence." W. B. Rankin, Assistant to the Commissioner of the Food and Drug Commission, pointed out that the new law is scheduled to become fully effective next July 22, and urged members of the pesticide industry to submit their petitions under it in the near future.

Michigan State Celebrates Centennial; Country's First Land Grant College

Michigan State College, the original model for America's 53 Land-Grant Colleges and Universities, is now celebrating its Centennial Year. Dedicated to the idea—revolutionary at the time—that higher education should be available to the children of farmers and laborers as well as to the wealthy, Michigan State symbolizes an important landmark in the history of the higher education, and the moulding of American economic strength and social institutions.

Starting as a tiny agricultural college in a muddy clearing chopped out of the Michigan woods in 1855, Michigan State served as a model for the Morill act of 1862, signed by President Lincoln, granting land to every state in the Union for the purpose of establishing colleges "where the leading object shall be, without excluding their scientific and classical studies and including military tactics, to teach such branches of learning as are related to agriculture and the mechanical arts . . . in order to promote the liberal and practical education of the industrial classes . . ."

Now the eighth largest university in the U.S., Michigan State had barely 63 students in 1857, while the teaching staff consisted of President Joseph R. Williams and four professors. The college itself was composed of a main hall, a dormitory, and a small brick stable. Today, it has 130 permanent buildings and 1000 temporary structures worth over 70 million dollars, and more than 15,500 students are taught by a faculty numbering over 2,000. In addition to its campus area of 570 acres, the college owns a considerable tract of experimental farm land.

Grasshoppers Show Increase in Midwest and Far West

There may be in increase in the infestations of grasshoppers this year, according to the U.S. Department of Agriculture. But the Mormon crickets will probably be less of a problem than they were in 1954.

Biggest grasshopper threat to croplands appears to be centered in Missouri, southern Wisconsin, the Texas Panhandle, and eastern Kansas. Fall surveys also showed a noticeable increase of 'hopper populations in northern Indiana, southern Iowa, eastern Nebraska, Minnesota, Oklahoma, and parts of Montana, North and South Dakota, and Utah. There is a build-up from last year on some western rangelands. Some six million acres of range may require grasshopper control in Montana, New Mexico, Oklahoma, Texas, Colorado, Arizona, Oregon, California, Wyoming, Utah, Kansas, Washington, Idaho, Nebraska, and Nevada.

Winter and spring weather and other natural conditions can alter the picture, according to entomologists. Drought since 1950 has increased grasshopper problems in much of the Midwest and West. However, in some parts of New Mexico and Texas, the weather has been so dry that even grasshoppers could not survive.

NEWS LETTER

Dr. E. L. Griffin Honored by Industry on Retiring from Government Career

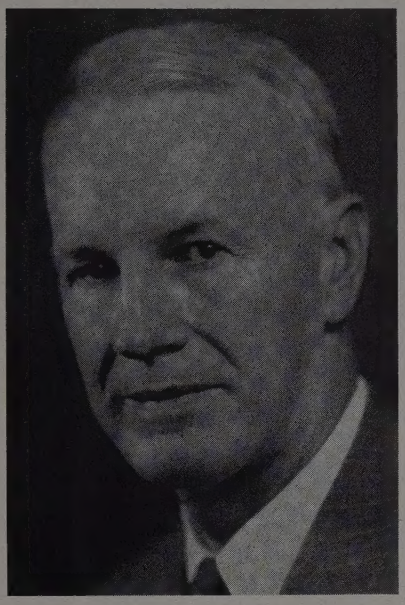
In a day when the relationships between scientists and government is very much in the news, the retirement of a chemist who has been in government service for 42 years may be revealing. On April 27, 1955, the NAC and other representatives of the pesticide industry will honor Dr. E. L. Griffin, retiring Assistant Head of the Pesticide Regulation Section, Plant Pest Control Branch of the Agricultural Research Service, USDA.

Dr. Griffin arrived in Washington in 1910, via a Kansas farm and the University of Kansas. When he joined the Department of Agriculture, it had 12,480 employees (it now has 76,767). He started as an assistant chemist analyzing Bordeaux mixtures, at a time when this, together with lead arsenate paste and Paris green, constituted the principal stock of insecticides. "No one worried about residues in those days", says Dr. Griffin.

Pinch Hit as Manufacturer

For a brief time, Dr. Griffin could say that he was a chemical manufacturer. When World War I cut off the supply from Germany of a sticky substance used to band trees against gypsy moth, Dr. Griffin swung into action on an emergency basis in the basement of the laboratories of the Chemical Bureau, and brewed two tons of a substitute compound in a 50 pound kettle. There were other moments of improvisation in early days, he also recalls, including the time when he conducted experimental work on the roof of the Chemical Building in downtown Washington to make hydrocyanic acid for use in fumigating cotton.

"Since 1928," says Dr. Griffin with a smile, "I have been a desk chemist. But it is a job which has never became routine." Though his office looks out on the Capitol, the excitement and headlines symbolized by that structure seem far removed, and an atmosphere of quiet efficiency prevails. Dr. Griffin himself, alert yet calm, represents the highest type of public servant: technically qualified, dedicated, persistent, gentlemanly.



Dr. E. L. Griffin

He is a far cry from the mental image that many people still conjure up when they think of a "bureaucrat".

Recognition Well Earned

Working over 40 years on enforcement of various Insecticide Acts, as various administrations have come and gone, Dr. Griffin has earned the recognition of the pesticide industry and of government for his long, able service.

Following his retirement at the end of this month, Dr. Griffin will return to Kansas, where he has a small river-bottom farm four miles north of Lawrence.

More Agricultural Research Urged by Cotton Council

The National Cotton Council has requested the House Agricultural Appropriations Subcommittee to develop a long-range program for the orderly expansion of agricultural research and education to "something approaching an adequate basis."

Wm. Rhea Blake, executive vice president of the Council, told the subcommittee last month that other governmental programs are on a long-range basis, citing particularly plans for the building of highways, schools, and housing over a period of years.

He requested that the same approach be taken to develop a sound program of research and education for agriculture.

The Council official, in testimony released today, also urged that the subcommittee approve as a minimum program the full amount requested in the Department of Agriculture budget for these functions.

Blake insisted that the only way to reduce the cost of production in the long run is through research. "Any other answer is simply going to reduce the farmer's net income," he said.

The Council official said that agriculture is not getting its rightful share of research.

He cited the fact that the Federal government paid about 62.5 per cent of the total research bill of $4 billion for the nation.

For agriculture research, the government's share was only 25 per cent.

Spain Producing Pesticides for Domestic Market

Production of pesticides in Spain has now reached the point where that country is almost self-sufficient in this field. Spain's normally archaic agricultural methods now are being modernized to the extent that pesticides are becoming widely used, and there are even two firms engaged in aerial crop dusting and spraying.

The domestic production of these chemicals, as shown in the U.S. Department of Commerce's "Foreign Commerce Weekly", is as follows:

	Metric Tons
DDT	500
BHC	600
Lindane	120
Oil emulsions	4,823
Arsenicals	1,500
Copper sulphate	16,807
Sulfur (for pesticides)	17,000

An estimated 80 percent of Spain's pesticide production is used in agriculture, with 13 percent for household use, and 7 percent in public-health applications.

Battle Against Weeds Launched on National Scale by New Society

Weed Society of America Founded to Aid in Developing Knowledge Concerning the Control of Weeds

Jack Dreessen
NAC Herbicide Specialist

December 8, 1954, marked an historic date in man's ageless battle against his number one agricultural pest—weeds. On that day the Weed Society of America was founded; a society dedicated to the task of furthering man's knowledge of weeds and their control.

The idea of a national weed society had its conception as far back as 1949. In September of that year representatives of the four regional weed conferences met to explore the need for a national weed organization that could speak with authority on weed matters of national concern.

This original group was known as the "Temporary National Advisory Committee of the Four Weed Conferences". The Temporary Committee unanimously agreed that there was a need for a central or national weed organization composed of people interested in all phases of weed control including research, regulatory, educational, and public health aspects.

The results of this meeting of the Temporary Committee was the founding of the Association of Regional Weed Control Conferences (ARWCC) composed of representatives from each of the four regional weed conferences in the United States. The stated purpose of ARWCC was to coordinate the activities of member conferences on weed control problems of national scope.

First National Meeting in 1953

At a meeting of delegates to the ARWCC in the Spring of 1950, interest was expressed in a national weed meeting. After much planning and hard work on the part of the ARWCC and other interested persons a national weed control conference was held in Kansas City, Missouri, in December of 1953. The first national weed meeting was held under the auspices of the ARWCC, and was held in conjunction with the North Central Weed Control Conference for that year.

Many leading weed workers still felt that even holding national weed control conferences was not adequate to meet the needs of solving national weed problems. Many were of the opinion that a natonal membership organization was necessary to carry out the purposes stated at the first meeting of the ARWCC. After much discussion and deliberation the four regional weed control conferences, through resolutions adopted at their respective meetings, directed the delegates to the ARWCC to develop the framework for organizing a national membership society devoted to furthering knowledge of weeds and their control. The results of this action was the founding of the Weed Society of America at the last meeting of the Association of Regional Weed Control Conferences in Fargo, North Dakota on December 8, 1954.

The founding of the Weed Society of America was the culmination of the dreams of many people. For several years these individuals had been striving for the establishment of an organization on a national scale that would foster the high ideals the Society sets forth. The need for such a Society is evidenced in many ways.

Need for Basic Research

We have passed through the era when hasty field tests of new herbicides was all that was required before farmers would accept them for general use. No longer can a chemical that exhibits some herbicidal properties find a market without considerable laboratory and field tests. In the past, practical research far exceeded basic research on herbicides. We must now stop and reconsider our research program in the light of new technological implications that face future herbicides. Basic research must receive more attention. The fundamentals of herbicidal action must be determined and understood by all interested in their development.

One of the objectives of the Weed Society of America is to aid the coordination of the activities of the regional weed conferences and weed workers in the United States. Such coordination will lead to a more rapid understanding of some of the basic principles involved in research.

The Weed Society of America can play a vital role in helping the field of weed control achieve proper recognition in the scientific world. Weed control is rapidly developing as a separate scientific discipline rather than as a branch of any single science. The proper approach to weed control investigations requires a combination of agronomy, horticulture, agricultural engineering, and public health. Weed control studies also draw heavily on the supporting sciences including chemistry, physics, ecology, botany, plant physiology, mathematics, engineering, and others. The founders of the Society had this in mind when they listed as one of the objectives "To foster high standards in weed control education and to encourage its acceptance as a major field of training".

Farm Losses to Weeds Staggering

When one considers the tremendous losses farmers suffer from weeds each year, it is even more apparent that there has been a need for a national organization to further the knowledge of weed control. In the United States alone, losses to weeds during the production of agricultural commodities is estimated to be 3.8 billion dollars annually. This staggering sum represents a loss of about five dollars per cultivated acre per year. In areas of highly specialized crops, the average per acre losses run much higher than the five dollars national average. Despite the excessive loss to weeds, farmers are seemingly slow to adopt good practices that offer them an opportunity to reduce this loss. It is estimated that herbicides are used on only about one-tenth of the cropland each year. Certainly herbicides are the tools that the modern farmer can use to supplement good cultural practices in combatting weed losses. One of the objectives of the Weed Society of America is to encourage and promote the development of weed control. If this objective is carried out, more and more farmers should begin to rely on weed control as one means of reducing production costs, thereby increasing returns on their investments.

Herbicides Leading Field

Herbicides are no longer the "stepchild" of the agricultural chemicals in-

(*Continued on Next Page*)

Application forms for membership in the Weed Society of America can be obtained by writing to Dr. W. C. Jacob, University of Illinois, Illinois Agricultural Experiment Station, or by writing to any officer of the Society.

Membership fees in the Society for 1955 are:

Active membership	$ 6.00
Sustaining membership	100.00

Membership fees include a subscription to the current volume of WEEDS.

Persons joining the Society prior to December 31, 1955 will become charter members of the Weed Society of America.

WEED SOCIETY—

(Continued from Page 10)

dustry. Factually enough, they can be referred to as the leader in the field now. A recent survey by personnel of the United States Department of Agriculture estimates that more than fifty per cent of all agricultural land sprayed or dusted for all purposes was treated for the control of weeds and brush. And yet, the modern field of chemical weed control is only a little over ten years old.

However, we cannot relax our efforts and still expect herbicides to maintain the prominent place they now hold among pesticides. True, the potentials for the use of herbicides are practically unlimited, but these potentials must be exploited by competent and trained individuals if the use of herbicides is to expand.

The Weed Society of America offers an opportunity to bring together the top personnel in both government and industry who are devoting their time and efforts to solving some of the basic problems concerning herbicides that have arisen on a national scale. The basic principles of the mode of action of translated herbicides will require an untold amount of study before an answer can be found. And the gathering implications of further regulations and legislation on the development of herbicides is certainly of importance to weed workers everywhere.

Charter Meeting Next January

The charter meeting of the Weed Society of America will be held January 4, 5, 6, 1956 at the Hotel New Yorker, New York City. At the charter meeting a constitution will be adopted by the members. All persons or organizations that join the Society prior to that time will be included as charter members.

Membership in the Weed Society of America is open to individuals and organizations of all nations who are interested in the objectives of the Society. Active and sustaining membership applications are now being accepted. Active members will include persons interested in weed control who have paid their annual dues. Active members may attend all meetings of the Society, vote on all matters pertaining to the Society, and may hold office. Payment of active membership dues includes a subscription to the current volume of "Weeds", the official publication of the Society.

Sustaining memberships will include persons or organizations who contribute annually to the permanent support of the Society. The names of all sustaining members will be published in all issues of "Weeds", and in the programs of regular meetings. Sustaining members will also receive a subscrpition to the current volume of "Weeds".

Conference Officers to Serve

The officers of and delegates to the Association of Regional Weed Control Conferences will serve as the Executive Committee of the Weed Society of America until the election of officers at the business meeting in New York in 1956. Officers serving during the organizational period are: R. H. Beatty, President; W. B. Ennis, Jr., Vice-President; and W. C. Shaw, Secretary-Treasurer.

Meetings of the Society will be held biennially at the time and place of a regional weed conference. It is expected that the meetings will rotate among the various conferences and the holding of a meeting in conjunction with a particular conference will depend upon receipt of an invitation from the conference and acceptance by the Executive Committee of the Society.

The Association of Regional Weed Control Conferences, at a meeting held in the Spring of 1950, recognized the need for a national publication to present articles of basic value in all phases of a national weed program. Out of this initial interest arose the publication, "Weeds", which became the official journal of the ARWCC.

Radioactive Insect Control

Radioactive male insects may provide a new means of insect control, according to Dr. James A. Beal, chief of USDA's Forest Insect Research Division. Speaking before the Southern Shade Tree Conference in Washington, D. C., Dr. Beal said that the fly population of the tropical island of Curacao was almost completely wiped out in a recent 2-month test.

Large numbers of male screw-worm flies were sterilized by using radioactive cobalt, then released at the rate of 400 per square mile per week during the mating season. The female flies, which mate only once during their lifetime, then produced their eggs, which were infertile in every case.

The results of the test, said Dr. Beal, represent a "milestone in entomology."

"Weeds" Official Journal

The founders of the Weed Society of America adopted the journal, "Weeds", as the Society's official publication. Official notices, committee reports, and other items of Society business will be published in the journal. Editorial policies will be established by the Executive Committee and the Editorial Board of the Society. Any member of the Society may contribute manuscripts to "Weeds", and acceptance of such contributions rests with the Editorial Board.

Dr. K. P. Buchholtz, Department of Agronomy of the University of Wisconsin, has been named Editor, and Dr. W. C. Jacob, University of Illinois, Illinois Agricultural Experiment Station has been named Business Manager of "Weeds". Inquiries regarding manuscripts should be directed to Dr. Buchholtz, and all inquiries regarding subscriptions, advertising, and other business affairs should be directed to Dr. Jacob.

It is especially noteworthy that a few men had the foresight as early as 1949 to set in motion the machinery that would one day result in the founding of a national society devoted to weeds and their control. We must not fail these pioneers. Any organization is only as strong as its members. All persons who are interested in the objectives of the Society owe it to themselves and to the expanding field of weed control to become charter members of the Weed Society of America.

OFFICIAL F.D.A. TOLERANCES LISTED

As a special service to readers of the NAC NEWS, we are reprinting the list of the official tolerances for various categories of crops and pesticides, as listed by the Food and Drug Administration. It will be noted that these are shown primarily by crop, rather than by chemical, thereby being of particular use to persons advising the grower.

These tolerances originally appeared in the Federal Register of March 11, 1955. For persons whose work requires close study of all possible footnotes and details of this subject, it is recommended that the original Federal Register be consulted in detail. The NAC will be glad to supply NAC NEWS readers with one copy each of the issue in question upon request, so long as supplies permit.

1. As used in agriculture today, the following poisonous or deleterious substances constitute no hazard to man:
Bordeaux mixture.
Copper acetate.
Copper carbonate, basic (malachite).
Copper-lime mixtures.
Copper oxychloride.
Copper silicate.
Copper sulfate.
Copper sulfate, basic.
Copper-zinc chromate.
Cuprous oxide.
Octacide 264 (*N*-Octylbicyclo-(2,2,1)-5-heptene-2,3-dicarboximide).
Petroleum oils.
Piperonyl butoxide.
Piperonyl cyclonene.
N-Propyl isome.
Pyrethrum and pyrethrins.
Rotenone or derris or cube roots.
Ryania.
Sabadilla.
No tolerances need be established for the residues of these pesticides on fruits or vegetables under section 406 of the Federal Food, Drug, and Cosmetic Act. These materials should be exempted under section 408 from the requirement of a tolerance when applied to growing crops.

2. The following poisonous or deleterious substances should not be used under conditions that will leave any toxic residues from them on fruits or vegetables as prepared for market.
Calcium cyanide.
Dinitro-*O*-sec. butylphenol.
Dinitro-*O*-cresol (sodium salt).
Hexaethyl tetraphosphate.
Mercury-containing compounds.
Hydrocyanic acid.
Selenium and selenium compounds.
Tetraethyl pyrophosphate.

FRUITS

(1) Apples, pears, and quinces.

Pesticide	*Tolerance*
Benzene hexachloride	5 parts per million
Chlordane	0.3 p. p. m.
DDT	7 p. p. m.
2,4-Dichlorophenoxy acetic acid	5 p. p. m.
Dicyclohexylamine salt of dinitro-*O*-cyclohexylphenol.	1 p. p. m.
Dieldrin	0.1 p. p. m.
EPN	3 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
2-Heptadecyl glyoxalidine	5 p. p. m.
Lead arsenate	7 p. p. m. of combined lead.
Methoxychlor	14 p. p. m.
Naphthalene acetic acid	1 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
Phenothiazine	7 p. p. m.
TDE	7 p. p. m.
Toxaphene	7 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(2) Apricots.

Pesticide	*Tolerance*
Benezene hexachloride	5 p. p. m.
Chlordane	0.3 p. p. m.
DDT	7 p. p. m.
Dicyclohexylamine salt of dinitro-*O*-cyclohexylphenol.	1 p. p. m.
Dieldrin	0.1 p. p. m.
EPN	3 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
Lead arsenate	7 p. p. m. of combined lead.
Methoxychlor	14 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
TDE	7 p. p. m.
Toxaphene	7 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(3) Avocados.

Pesticide	*Tolerance*
Benzene hexachloride	5 p p. m.
DDT	7 p. p. m.
Lead arsenate	7 p. p. m. of combined lead.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.

(4) Blackberries. For tolerances established for pesticide residues on blackberries, see subparagraph (27) of this paragraph.

(5) Blueberries (huckleberries).

Pesticide	*Tolerance*
Calcium arsenate	3.5 p. p. m. of combined As_2O_3.
Chlordane	0.3 p. p. m.
DDT	7 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
Lead arsenate	7 p. p. m. of combined lead.
Methoxychlor	14 p. p. m.
Parathion	1 p. p. m.
TDE	7 p. p. m.
Ziram	7 p. p. m.

(6) Cherries.

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
Chlordane	0.3 p. p. m.
DDT	7 p. p. m.
Dicyclohexylamine salt of dinitro-*O*-cyclohexylphenol.	1 p. p. m.
Dieldrin	0.1 p. p. m.
EPN	3 p. p. m.
Ferbam	7 p. p. m.
2-Heptadecyl glyoxalidine	5 p. p. m.
Lead arsenate	7 p. p. m. of combined lead.
Methoxychlor	14 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
TDE	7 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(7) Citrus fruits (grapefruit, lemons, limes, oranges, tangerines).

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
Chlordane	0.3 p. p. m.
DDT	7 p. p. m.
2,4,Dichlorophenoxy acetic acid	5 p. p. m.
Dicyclohexylamine salt of dinitro-*O*-cyclohexylphenol.	1 p. p. m.
Dinitro-*O*-cyclohexylphenol	1 p. p. m.
EPN	3 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
Lead arsenate	1 p. p. m. of combined lead.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
Tartar emetic	3.5 p. p. m. of combined antimony trioxide.
TDE	7 p. p. m.
Toxaphene	7 p. p. m.
Zineb	7 p. p. m.

(8) Cranberries.

Pesticide	*Tolerance*
DDT	7 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
Lead arsenate	7 p. p. m. of combined lead.
Methoxychlor	14 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(9) Currants.

Pesticide	*Tolerance*
DDT	7 p. p. m.
Ferbam	7 p. p. m.
Lead arsenate	7 p. p. m. of combined lead.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
Zineb	7 p. p. m.

(10) Dates.

Pesticide	*Tolerance*
Ferbam	7 p. p. m.
Parathion	1 p. p. m.

(11) Figs.

Pesticide	*Tolerance*
Parathion	1 p. p. m.

(12) Gooseberries.

Pesticide	*Tolerance*
DDT	7 p. p. m.
Ferbam	7 p. p. m.
Lead arsenate	7 p. p. m. of combined lead.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(13) Grapefruit. For tolerances established for pesticide residues on grapefruit, see subparagraph (7) of this paragraph.

(14) Grapes.

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
Chlordane	0.3 p. p. m.
DDT	7 p. p. m.
Dicyclohexylamine salt of dinitro-*O*-cyclohexylphenol.	1 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
Lead arsenate	7 p. p. m. of combined lead.
Methoxychlor	14 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
Sodium arsenate	3.5 p. p. m. of combined As_2O_3.
Tartar emetic	3.5 p. p. m. of combined antimony trioxide.
TDE	7 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(15) Guavas.

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
DDT	7 p. p. m.
Ferbam	7 p. p. m.
Parathion	1 p. p. m.
Zineb	7 p. p. m.

(16) Lemons. For tolerances established for pesticide residues on lemons, see subparagraph (7) of this paragraph.

(17) Loganberries. For tolerances established for pesticide residues on loganberries, see subparagraph (27) of this paragraph.

(18) Mangoes.

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
DDT	7 p. p. m.
Ferbam	7 p. p. m.
Lead arsenate	7 p. p. m. of combined lead.
Parathion	1 p. p. m.

(19) Nectarines. For tolerances established for pesticide residues on nectarines, see subparagraph (22) of this paragraph.

(20) Oranges. For tolerances established for pesticide residues on oranges, see subparagraph (7) of this paragraph.

(21) Papayas.

Pesticide	*Tolerance*
Chlordane	0.3 p. p. m.
DDT	7 p. p. m.
Ferbam	7 p. p. m.

(22) Peaches and nectarines.

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
Chlordane	0.3 p. p. m.
DDT	7 p. p. m.
Dicyclohexylamine salt of dinitro-*O*-cyclohexylphenol.	1 p. p. m.
Dieldrin	0.1 p. p. m.
EPN	3 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
Lead arsenate	7 p. p. m. of combined lead.
Methoxychlor	14 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
TDE	7 p. p. m.
Toxaphene	7 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(23) Pears. For tolerances established for pesticide residues on pears, see subparagraph (1) of this paragraph.

(24) Pineapples.

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
Chlordane	0.3 p. p. m.
DDT	7 p. p. m.
EPN	3 p. p. m.
Methoxychlor	14 p. p. m.
Parathion	1 p. p. m.

(25) Plums (fresh prunes).

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
Chlordane	0.3 p. p. m.
DDT	7 p. p. m.
Dicyclohexylamine salt of dinitro-*O*-cyclohexylphenol.	1 p. p. m.
EPN	3 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
Lead arsenate	7 p. p. m. of combined lead.
Methoxychlor	14 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
TDE	7 p. p. m.
Zineb	7 p. p. m.

(26) Quinces. For tolerances established for pesticide residues on quinces see subparagraph (1) of this paragraph.

(27) Raspberries, blackberries, loganberries, and related berries.

Pesticide	*Tolerance*
Calcium arsenate	3.5 p. p. m. of combined As_2O_3.
Chlordane	0.3 p. p. m.
DDT	7 p. p. m.
Dicyclohexylamine salt of dinitro-*O*-cyclohexylphenol.	1 p. p. m.
EPN	3 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
2-Heptadecyl glyoxalidine	5 p. p. m.
Lead arsenate	7 p. p. m. of combined lead.
Methoxylchlor	14 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
TDE	7 p. p. m.
Toxaphene	7 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(28) Rhubarb.

Pesticide	*Tolerance*
DDT	7 p. p. m.

(29) Strawberries.

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
Calcium arsenate	3.5 p. p. m. of combined As_2O_3.
Chlordane	0.3 p. p. m.
DDT	7 p. p. m.
Dicyclohexylamine salt of dinitro-*O*-cyclohexylphenol.	1 p. p. m.
EPN	3 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
Lead arsenate	7 p. p. m. of combined lead.
Methoxychlor	14 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
TDE	7 p. p. m.
Toxaphene	7 p. p. m.
Zineb	7 p. p. m.

(30) Tangerines. For tolerances established for pesticide residues on tangerines, see subparagraph (7) of this paragraph.

VEGETABLES

(31) Artichokes.

Pesticide	*Tolerance*
DDT	7 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.

(32) Asparagus.

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
Calcium arsenate	3.5 p. p. m. of combined As_2O_3.
DDT	7 p. p. m.
Ferbam	7 p. p. m.
Lead arsenate	7 p. p. m. of combined lead.
Methoxychlor	14 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.

(33) Beans, green beans, snap beans, lima beans, and black-eyed peas.

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
Calcium arsenate	3.5 p. p. m. of combined As_2O_3.
Chlordane	0.3 p. p. m.
DDT	7 p. p. m.
Dicyclohexylamine salt of dinitro-*O*-cyclohexylphenol.	1 p. p. m.
EPN	3 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
Magnesium arsenate	3.5 p. p. m. of combined As_2O_3.
Methoxychlor	14 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
TDE	7 p. p. m.
Toxaphene	7 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(Continued on Next Page)

(34) Beets (with or without tops) or beet greens alone.

Pesticide	*Tolerance*
Chlordane	0.3 p. p. m.
DDT	7 p. p. m.
EPN	3 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
Methoxychlor	14 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(35) Black-eyed peas. For tolerances established for pesticide residues on black-eyed peas, see subparagraph (33) of this paragraph.

(36) Broccoli.

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
Calcium arsenate	3.5 p. p. m. of combined As_2O_3.
Chlordane	0.3 p. p. m.
DDT	7 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
Methoxychlor	14 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
TDE	7 p. p. m.
Toxaphene	7 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(37) Brussels sprouts. For tolerances established for pesticide residues on brussels sprouts, see subparagraph (38) of this paragraph.

(38) Cabbage, brussel sprouts, kohlrabi, cauliflower.

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
Calcium arsenate	3.5 p. p. m. of combined As_2O_3.
Chlordane	0.3 p. p. m.
Copper arsenate	3.5 p. p. m. of combined As_2O_3.
DDT	7 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
Methoxychlor	14 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
TDE	7 p. p. m.
Toxaphene	7 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(39) Carrots (with or without tops) or carrot tops.

Pesticide	*Tolerance*
Calcium arsenate	3.5 p. p. m. of combined As_2O_3.
Chlordane	0.3 p. p. m.
Copper arsenate	3.5 p. p. m. of combined As_2O_3.
DDT	7 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
Parathion	1 p. p. m.
TDE	7 p. p. m.
Toxaphene	7 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(40) Cauliflower. For tolerances established for pesticide residues on cauliflower, see subparagraph (38) of this paragraph.

(41) Celery.

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
Calcium arsenate	3.5 p. p. m. of combined As_2O_3.
Chlordane	0.3 p. p. m.
DDT	7 p. p. m.
Dicyclothexylamine salt of dinitro-*O*-cyclohexylphenol.	1 p. p. m.
Ferbam	7 p. p. m.
Lead arsenate	7 p. p. m. of combined lead.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
Toxaphene	7 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(42) Collards. For tolerances established for pesticide residues on collards, see subparagraph (47) of this paragraph.

(43) Corn.

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
Calcium arsenate	3.5 p. p. m. of combined As_2O_3.
Chlordane	0.3 p. p. m.
DDT	7 p. p. m.
EPN	3 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
Methoxychlor	14 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
TDE	7 p. p. m.
Toxaphene	7 p. p. m.
Zineb	7 p. p. m.

(44) Cucumbers.

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
Calcium arsenate	3.5 p. p. m. of combined As_2O_3.
Chlordane	0.3 p. p. m.
DDT	7 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
Methoxychlor	14 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
TDE	7 p. p. m.
Toxaphene	7 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(45) Eggplants.

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
Calcium arsenate	3.5 p. p. m. of combined As_2O_3.
Chlordane	0.3 p. p. m.
DDT	7 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
Lead arsenate	7 p. p. m. of combined lead.
Methoxychlor	14 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
TDE	7 p. p. m.
Toxaphene	7 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(46) Endive and escarole.

Pesticide	*Tolerance*
DDT	7 p. p. m.
Parathion	1 p. p. m.
Zineb	7 p. p. m.

(47) Kale and collards.

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
Calcium arsenate	3.5 p. p. m. of combined As_2O_3.
Chlordane	0.3 p. p. m.
DDT	7 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
Methoxychlor	14 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(48) Kohlrabi. For tolerances established for pesticide residues on kohlrabi, see subparagraph (38) of this paragraph.

(49) Lettuce.

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
Chlordane	0.3 p. p. m.
DDT	7 p. p. m.
EPN	3 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
Methoxychlor	14 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
TDE	7 p. p. m.
Toxaphene	7 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(50) Lima beans. For tolerances established for pesticide residues on lima beans, see subparagraph (33) of this paragraph.

(51) Melons, including cantaloupes, muskmelons, watermelons, and other melons.

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
Calcium arsenate	3.5 p. p. m. of combined As_2O_3.
Chlordane	0.3 p. p. m.
DDT	7 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
Methoxychlor	14 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
TDE	7 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(52) Mushrooms.

Pesticide	*Tolerance*
DDT	7 p. p. m.
Methoxychlor	14 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.

(53) Mustard greens.

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
DDT	7 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
Zineb	7 p. p. m.

(54) Okra.

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
Chlordane	0.3 p. p. m.
DDT	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
Toxaphene	7 p. p. m.

(55) Onions.

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
Chlordane	0.3 p. p. m.
Dieldrin	0.1 p. p. m.
DDT	7 p. p. m.
Ferbam	7 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine
Parathion	1 p. p. m.
Tartar emetic	3.5 p. p. m. of combined antimony trioxide
Toxaphene	7 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(56) Parsley.

Pesticide	*Tolerance*
Nicotine-containing compounds	2 p. p. m. of nicotine.
Zineb	7 p. p. m.

(57) Parsnips (with or without tops) or parsnip greens alone.

Pesticide	*Tolerance*
DDT	7 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.

(58) Peanuts.

Pesticide	*Tolerance*
Chlordane	0.3 p. p. m.
DDT	7 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
Parathion	1 p. p. m.
Toxaphene	7 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(59) Peas.

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
Chlordane	0.3 p. p. m.
DDT	7 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
Methoxychlor	14 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
TDE	7 p. p. m.
Toxaphene	7 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(60) Peppers.

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
Calcium arsenate	3.5 p. p. m. of combined As_2O_3.
Chlordane	0.3 p. m.
DDT	7 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
Lead arsenate	7 p. p. m. of combined lead.
Methoxychlor	14 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
TDE	7 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(61) Potatoes. Tolerances are not needed for those pesticides applied only to the foliage of potatoes and that are not translocated to the tubers.

Pesticide	*Tolerance*
Aldrin	0.1 p. p. m.
Chlordane	0.3 p. p. m.
Heptachlor	0.1 p. p. m.

(62) Pumpkins.

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
Calcium arsenate	3.5 p. p. m. of combined As_2O_3.
DDT	7 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
Methoxychlor	14 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
TDE	7 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(63) Radishes (with or without tops) or radish tops.

Pesticide	*Tolerance*
Chlordane	0.3 p. p. m.
DDT	7 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
Methoxychlor	14 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
TDE	7 p. p. m.
Toxaphene	7 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(64) Rutabagas (with or without tops) or rutabaga tops. For tolerances established for pesticide residues on rutabagas, see subparagraph (71) of this paragraph.

(65) Salsify.

Pesticide	*Tolerance*
Zineb	7 p. p. m.

(66) Spinach.

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
Calcium arsenate	3.5 p. p. m. of combined As_2O_3.
DDT	7 p. p. m.
EPN	3 p. p. m.
Ferbam	7 p. p. m.
Methoxychlor	14 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
TDE	7 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(67) Squash, summer squash.

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
Calcium arsenate	3.5 p. p. m. of combined As_2O_3.
Chlordane	0.3 p. p. m.
DDT	7 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
Methoxychlor	14 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
TDE	7 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(68) Sweetpotatoes. Tolerances are not needed for those pesticides applied only to foliage of sweetpotatoes and which are not translocated to the tubers.

Pesticide	*Tolerance*
Aldrin	0.1 p. p. m.

(69) Swiss chard.

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
DDT	7 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
TDE	7 p. p. m.
Zineb	7 p. p. m.

(70) Tomatoes.

Pesticide	*Tolerance*
Benzene hexachloride	5 p. p. m.
Calcium arsenate	3.5 p. p. m. of combined As_2O_3.
Chlordane	0.3 p. p. m.
Copper arsenate	3.5 p. p. m. of combined As_2O_3.
DDT	7 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined fluorine.
Lead arsenate	7 p. p. m. of combined lead.
Methoxychlor	14 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
TDE	7 p. p. m.
Toxaphene	7 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(71) Turnips or rutabagas (with or without tops) or turnip greens or rutabaga tops.

Pesticide	*Tolerance*
Calcium arsenate	3.5 p. p. m. of combine As_2O_3.
Chlordane	0.3 p. p. m.
DDT	7 p. p. m.
EPN	3 p. p. m.
Ferbam	7 p. p. m.
Fluorine compounds	7 p. p. m. of combined As_2O_3.
Methoxychlor	14 p. p. m.
Nicotine-containing compounds	2 p. p. m. of nicotine.
Parathion	1 p. p. m.
TDE	7 p. p. m.
Zineb	7 p. p. m.
Ziram	7 p. p. m.

(EDITOR's Note: In a supplement to the above listing, the Federal Register of March 25, 1955 established additional tolerances as follows:

§ 120.102 *Tolerances for residues of SES (sodium 2,4-dichlorophenoxyethyl sulfate).* The following tolerances are established for residues of SES (sodium 2,4-dichlorophenoxyethyl sulfate) in or on the raw agricultural commodities indicated:

(a) 6 parts per million in or on potatoes, peanuts, peanut hulls, peanut hay.

(b) 2 parts per million in or on asparagus, strawberries.

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